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A COMPACT TRANSISTORIZED PULSE UNIT

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Translation of "Malogabaritnaya impul'snaya
pristavka na tranzistorakh".

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ABSTRACT: The circuit of a miniature transistorized pulse unit designed by the author and which is used in the Kishinev Satellite Tracking Station is described.

The standard IP-M pulse unit used in satellite tracking stations to impress radio time signals on the chronograph tape has a number of important shortcomings. The delay of the unit is quite large, being of the order of 10^{-2} seconds, due to the fixed inertia of the electro-mechanical polarized relay RP-5 in the IP-M output. A second inadequacy of the IP-M is its operational unreliability, related to the rapid loss of emission from the cathode of the 6H15P tube which forms the trigger. In addition, the IP-M requires preheating in operation and therefore the unit cannot be used if time signals are to be supplied within less than two minutes. On the other hand, the switching of the unit may also be presumed to be unsatisfactory in protracted operation for the reasons pointed out above. This, of course, makes the use of the IP-M definitely inconvenient.

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None of the disadvantages of the IP-M unit noted above are present in the small transistorized pulse unit designed by the author and which is presently in use in the Kishinev satellite tracking station.

The proposed pulse unit differs from the standard commercial IP-M pulse unit by its exceptionally fast action, its high sensitivity and its very low response to radio noise.

The fast action is realized by using an MP25-A transistor operating in the keying mode at the output of an electronic relay, so that the operating time of this pulse unit is not more than 2×10^{-5} seconds with signal input voltages of 0.5 to 0.8 volts.

The circuit of the pulse unit is shown in the diagram. The unit is made up of six transistors and four semiconductor diodes. It is supplied by a 9-volt battery and requires a current of 4 ma.

The basic components of the circuit are as follows: A selective amplifier, a voltage-doubling rectifier, a pulse amplifier and an electronic relay. The use of a selective amplifier, with a separate twin-T bridge from the input and from the collector load of the transistor, allowed us to realize a considerable improvement in amplifier quality without impairing the amplification factor in the process. The audio time-signal voltage is supplied from the output of the audio-frequency amplifier to the input of the selective low-frequency amplifier, which is tuned to 1000 Hz. The amplified time-signal voltage is detected, with voltage doubling, by

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*Numbers in the margin indicate pagination in the foreign text.

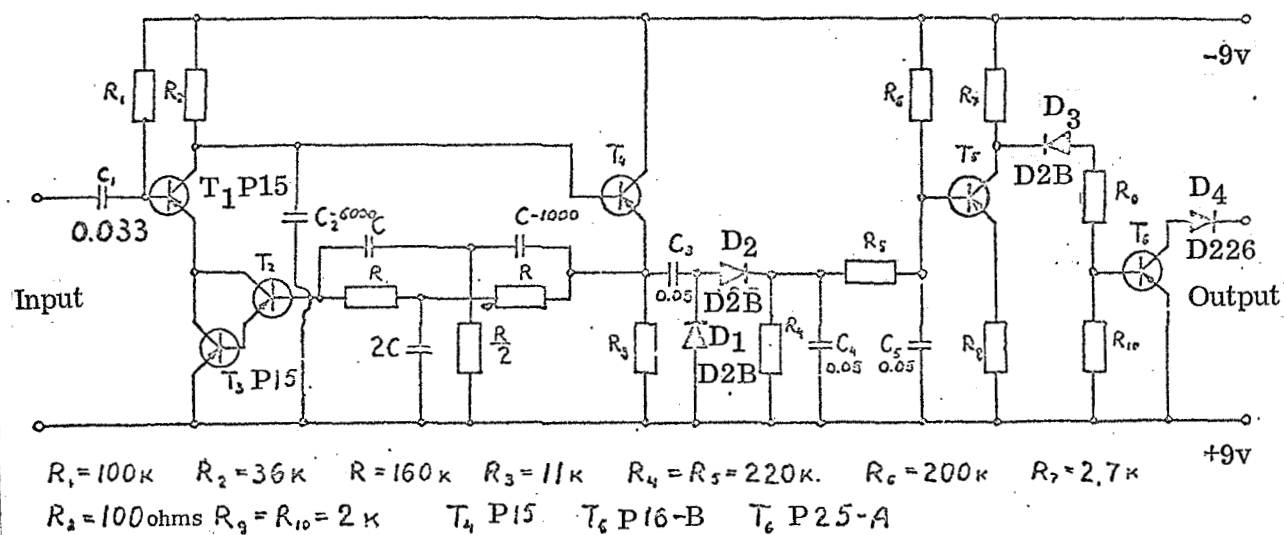


Figure 1. Circuit of the Transistorized Pulse Unit.

diodes D_1 and D_2 . The voltage pulses are smoothed by a filter consisting of capacitors C_4 and C_5 and resistances. The time constant of the filter was chosen large enough to prevent the unit from operating on noise pulses. The diode D_4 protects the T_6 transistor if the unit is incorrectly connected to the chronograph.

The entire circuit is assembled on a printed circuit board; the outside dimensions of the device are 110 mm x 80 mm x 40 mm.

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